

Our Reference: RST-007-B

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Shoberg, Ralph S.  
Serial Number: 09/825,416  
Filing Date: April 3, 2001  
Examiner/Art Group Unit: Eric B. Compton/3726  
Title: METHOD AND APPARATUS FOR AUDITING A  
TENSION LOAD IN THE THREADED FASTENER



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**DECLARATION OF RALPH S. SHOBERG UNDER 37 C.F.R. § 1.132**

I, Ralph S. Shoberg, being competent to testify make this declaration on the basis of personal knowledge.

1. I am the President of R.S. Technologies, Ltd. (hereinafter RST) and the inventor of the torque audit method set forth in United States Application Serial No. 09/825,416 (hereinafter the '416 application.)
2. I have worked in the field of threaded fastener assembly and auditing for nearly forty years. In 1991 I formed RST.
3. Until my invention of the audit technique of this patent application, threaded fastener audits were strictly torque based. These techniques used peak torque; torque vs. time and torque vs. angle signatures to attempt to estimate the torque which had been previously applied to a threaded fastener. None of these techniques attempt to relate the torque reading to the actual clamp force of the bolted joint by any other means than an assumption that a constant nut factor

could be applied to the torque readings. The nut factor is a number which when multiplied by the torque will provide an estimate of the clamp load. However, it is well known that there can be a large scatter in nut factors for a given nut and bolt. This scatter can be caused by variations in friction, materials, lubrication, and surface finishes to name a few.

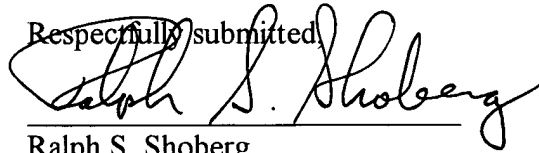
4. Because the nut factor is not a true constant, but merely an estimate with possible wide scatter, experts in the field, such as John Bickford, have described the search for a trustworthy nut factor nothing short of the quest for the "holy grail." See selected portions of Mr. Bickford's 1995 text attached as Exhibit A.
5. The invention set forth in my claims 18-21, is an audit method for threaded fasteners which eliminates the reliance on a nut factor and provides accurate comparative clamp load measurements. This result cannot be obtained using break away torque alone. By eliminating any reliance on the nut factor, the method has been recognized as the "holy grail of torque auditing."
6. My invention has been described in such publications as Machine Design magazine. See Exhibit B. I am informed by the editor of Machine design magazine that the article describing my invention has been requested for reprint more than any other article in the history of the magazine.
7. I was also asked by Mr. John Bickford and Dr. Sayed Nassar to author several chapters in their updated handbook on bolted joints. One of these chapters deals with torque tension audits described in my current patent application. (See attached Exhibit C).

8. Additionally I was asked to write the first chapter ever covering testing of threaded fasteners for Volume 8 of the ASM handbook on Mechanical Testing and Evaluation. This chapter described among other things my inventive method of auditing threaded fasteners and bolted joints. (See attached Exhibit D).
9. The threaded fastener audit technique described in my patent has been used to solve problems at the icons of American manufacturing and aerospace. Using the inventive audit method, my company has solved fastening problems for General Motors Corporation, Ford Motor Company, Daimler Chrysler; Robert Bosch, Caterpillar, and NASA. RST employs a full time engineer who works on nothing but testing of threaded fasteners and bolted joints to solve customer problems. The techniques of the my invention are applied on a daily basis in this regard.
10. General Motors approached RST to train approximately 50 engineers to utilize RST software for bolted joint design and analysis which incorporate the audit method of the instant invention.
11. The success and accolades enjoyed by RST with respect to the software products which incorporate the instant invention, including the work RS Technologies does using the instant invention to solve bolted joint problems is not the result of any different marketing approach used by RST. The success is related to the providing of accurate results and solving real world problems.

**DECLARATION**

*I declare under penalty of perjury that the foregoing is true and correct.*

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Ralph S. Shoberg", written over a horizontal line.

Ralph S. Shoberg

Dated: 10/27/2003